REMARKS

Claims 8-11, 30-32, 35 and 40-52 are pending in the application. Claims 41, 42 and 44-52 have been withdrawn with claim 51 having been amended and claims 8-10, 30-32, 35 and 40 having been amended by the foregoing amendment. Applicants appreciate the Examiner's consideration, and making a record, of documents submitted in Information Disclosure Statements (IDS).

The drawings stand objected to for including reference character(s) S7 of Figure 3 not being mentioned in the description and for not including reference sign(s) 24, 89 and 550 in Figure 4 that were mentioned in the description.

In the attached substitute specification page number 22, line 31, reference is made to S7. Figure 4 has been amended to remove reference characters that have been used to designate multiple parts. Figure 6 has also been amended Character 24 has been relabeled as 425 on substiture page number 26, line 15. Character 89 is included in Figure 2b and character 550 has been relabeled as 455 in Figure 4.

No new matter has been introduced as a result of the relabeling of Figures 4 and 6; entry of these Substitute Sheets representing amended Figurs 4 and 6 is requested.

The specification has been amended to conform to the relabeling of the various reference characters in Figure 4 as well as to overcome the objections raised in the Office Action. No new matter has been introduced into the application by the attached substiture specification sheets. Entry of these substitute sheets of the Specification is also requested. It is believed that the substitute specification sheets overcome the objections of the disclosure.

Similarly, the Abstract has been amended by the attached Substiture Abstract to overcome the objections raised in the Office Action. Again, no new matter has been introduced into the application by the Substitute Abstract and Applicants respectfully request entry of the Substitute Abstract.

Accordingly, Applicants request withdrawal of the objections to the drawings, the specification, the claims and the abstract.

It is believed that objections to claim 8 have also been overcome by the foregoing amendment and Applicants request withdrawal of this objection as well.

Claims 8, 30, 31, 35 and 43 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,865,829 (Kitajima). Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kitajima. Claims 10 and 11 stand rejected under §103(a) as being unpatentable over Kitajima in view of U.S. Patent No. 6,371,908 (Furosawa). Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Kitajima in view of JP 10325798A (Imaizumi). Applicants request traversal of this rejection for the following reasons.

Exemplary embodiments disclose plural images of the object region being sequentially detected. Amended claim 8 recites, *inter alia*, an image memory for storing a set of first image data representing plural images of the object region sequentially detected by the first camera during at least a time duration and a display system configured to sequentially display plural second representation generated from at least a subset of the set of first image data such that the plural second representations are displayed in superposition with the first representation for observation by a user.

Plural second representations generated from the stored image data are sequentially displayed by the display system (somewhat like a video clip) and they are displayed in superposition with the first representation (the visible light image) for observation by the user.

Kitajima discloses (in Figure 8 and at col. 9, line 53) an image memory 160, 161 for storing a plurality of images (frame memories a, b, c, etc.). One image stored in the memory (current image) is displayed on a monitor 67 or LED display 93.

Kitajima simply fails to disclose a plurality of stored images being displayed as a sequence of plural images. The plurality of frame memories in Kitajima appear to be used for archival purposes.

Furthermore, if the image generated by LED display 93 is to be displayed to the user through oculars, quick return half mirror 81 has to be switched to its position shown in solid lines in Figure 8 such that the other beam path for providing the visible light image to the oculars is blocked by mirror 81. If the quick return half mirror 81 is switched to the position shown by the dashed line in Figure 8, the visible light image of the object is provided to the oculars, but it appears impossible for the user to perceive the image generated by the LED display. It does not appear possible for a representation displayed by the display system to be displayed in superposition with the first representation provided by the second beam path as recited in claim 8.

Kitajima fails disclose or suggest displaying plural images generated from the first beam path as a sequence and in superposition with the magnigied first representation generated by the second beam path. Kitajima fails to anticipate Applicants' invention as recited in claim 8.

At least for these reasons, it is believed claim 8 is allowable over Kitajima. Claims 9-11, 30-32 and 43, all of which depend in allowable claim 8 are also allowable at least based on their dependence. In addition, Furosawa and Imaizumi fail to overcome the deficiencies of Kitajima highlighted above.

Claim 35 similarly recites recording a series of images during a time duration (sequence) and displaying the recorded series superimposed with the first representation. Claim 35 is also allowable over Kitajima.

Claim 40 stands rejected under 35 U.S.C. § 102(a) as being anticipated by *Near-Infrared Indocyanine Green Video Angiography* (Raabe). Claim 40 also stands rejected under §103(a) as being unpatentable over WO01/22870A1 (Chari) in view of U.S. Patent No. 6,721, 590 (Ohishi).

The subject matter of claim 40 is entirely attributable to Andreas Raabe. Therefore, the Raabe article does not qualify as a 102(a) reference.

Claim 40 has also been amended to recite assessing a complete blocking of the aneurysm sac with the clip based on the at least one fluorescence image. Chari and Ohishi fail to disclose assessing complete blocking of the aneurysm sag based on the fluorescence image.

Claim 40 is allowable over the cited documents.

All of the rejections having been overcome, it is believed that this application is in condition for allowance and a notice to that effect is solicited. Should the Examiner have any questions with respect to expediting the prosecution of this application, he is urged to contact the undersigned at the number listed below.

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with a higher intensity in the generated fluorescence image.

According to a preferred embodiment the microscopy system is used in the method of treating the aneurysm.

According to a further embodiment the invention provides a microscopy system comprising a microscopy optics, an illumination system and a controller. The microscopy optics again comprises a first and a second beam path which may traverse a common objective lens of the microscopy optics. The first beam path images the object region onto a camera for generating image data representing the object region. The illumination system provides an illuminating light beam directed to the object region. A filter is disposed in a first position within the beam path of the illuminating light beam. The illuminating system further comprises an actuator for changing the position of the filter from a second position in which the filter is not disposed within the beam path to the first position.

The controller is configured to analyze the image data recorded with the camera, and to control the actuator for displacing the filter from the first position to the second position based on such analysis. The ~~the~~ analysis may comprise a determination of light intensities at particular portions of the images recorded with the camera.

Preferably the filter is a filter of such type that it eliminates light having wavelengths greater than a predetermined wavelength from the illuminating light beam. The predetermined wavelength is preferably greater than 690 nm. Further, the predetermined wavelength is preferably smaller than 800 nm.

19, respectively. The image perceived with the left eye 18 corresponds to an image when looking onto the object under an angle α with respect to the optical axis, and the image perceived with the right eye 19 corresponds to an image when looking onto the object 9 under an angle $-\alpha$ with respect to the optical axis 7, such that the user perceives a stereoscopic image of the object 9 with his both eyes 18, 19.

A partially transmissive mirror 21 is disposed in the partial beam 15 for branching off a portion of the light thereof as a beam 23. Beam 23 is split ~~splitted~~ with a further beam splitter 25 to form beams 27 and 29. Beam 27 is supplied to a light sensitive element of a camera 32 through a camera adapter optics 31 such that the camera 32 detects an image of the object 9 under an observation angle $-\alpha$ with respect to optical axis 7. The images detected with camera 32 are transmitted as image data through a data line 33 to a controller 35.

A beam 39 is branched off from partial beam 14 by a partially transmissive mirror 37. Beam 39 is supplied to a light sensitive element of a further camera 43 through a camera adapter optics 41 such that camera 43 detects images of the object 9 under an observation angle α with respect to the optical axis 7. The images detected by camera 43 are supplied as image data to controller 35 through a data line 45. The controller transmits the images detected by cameras 32, 43 as image data through a line 47 to a head mounted display 49 which is carried by a user of the microscopy system 1 at his head such that integrated displays of the head mounted display 49 which are schematically indicated with reference numerals 51 and 52 in figure 1 provide respective images which may be perceived by the user with his left and right eyes, respectively.

entering a vessel system allows to assess and verify structures or functions of the vessel system. At a time after the fluorescent substance has entered the vessel system the detected image will be substantially stationary in time, and substantially no additional information may be gained from further observation of the infrared light image. Since such process of entering the vessel system is of a relatively short duration of one to five seconds, a surgeon would have to watch the process with highest concentration and memorize the time dependence of the process for each vessel of interest. The possibility of storing the images detected by camera 55 during the process and the possibility to repeatedly display the stored images as a film will help the surgeon in gaining a complete impression of the observed process.

An embodiment of a method of operating the microscopy system 1 will be illustrated below with reference to the flowchart of figure 3. At a start of an imaging procedure the thermal protective filter 85 is disposed in the beam path of the illumination system 63, and the controller waits in [[a]] step S1 for a start button of a switch 97 or some other input means being operated by the surgeon or his assistant. Preferably, the start button 97 will be operated shortly before or after the injection of the fluorescent substance into the patient. In [[a]] step S3 the actuator removes the thermal protective filter 85 from the beam path and inserts fluorescent imaging filter 84 in the beam path, and in [[a]] S5 a counter n is reset. Thereafter, an image B(0) detected by camera 55 is stored as image data in memory 95 (S7). This image is also transferred by controller 35 to display 69. Display 69 displays the image such that the surgeon may perceive the image in superposition with the visible light image of the object 9 when looking into the ocular (S9). Thereafter counter n is incremented (S11), a next image B(n) is received from

camera 55 and stored in memory 95 (S13), and this image B(n) is visualized by display 69 or 51 in [[a]] step S15.

Since the vessel system under observation does not contain fluorescent substance at the start of the procedure, the first detected images B(n) show substantially no intensities of infrared light. The fluorescent substance propagates through the body of the patient and finally enters the tissue region 9 in the object field of the microscopy objective 3 such that the images B(n) show successively increasing infrared intensities. The controller 35 analyses the intensities of the images B(n) and compares the intensities in [[a]] step S17 with a first predetermined threshold. If the intensity of the latest detected image B(n) is less than the first threshold, processing is continued with step S11. If the intensity of image B(n) is higher than the first threshold this is indicative of a point in time used as a start of a series of detected images which series will be repeatedly displayed to the user later. The current value of counter n is assigned to a variable nstart in [[a]] step S19.

Thereafter the counter is incremented (S20), the next image B(n) is obtained and stored (S21) and displayed (S23). The controller 35 compares in [[a]] step S25 the intensity of the last detected image B(n) with the intensity of the second last image B(n-1) and continues processing at step S20, if the difference between both intensities is higher than a predetermined second threshold value. The second threshold value is chosen such that the condition of step ~~S24~~ S25 will not be fulfilled shortly after the start of the substance entering the vessel system since the intensities will continuously increase at that time. At some later time the concentration of the fluorescent substance will come close to a saturation, and differences between intensities of subsequent images B(n) and B(n-1)

will become smaller than the second threshold value. This is indicative of a point in time at which the series of detected images should be terminated. The current value of the counter n is assigned to a variable nend ~~nende~~ in [[a]] step S27, and the fluorescent imaging filter 83 is removed from the beam 74 and the thermal protective filter 85 is inserted in beam 74 in [[a]] step S29.

Thereafter the processing is continued by repeatedly displaying the detected images with displays 69 or 51. For this purpose the counter n is set to the value nstart corresponding to the start of the series of images (S31), in which B(n) is displayed (S33), and the counter n is incremented (S35). If a present value of counter n is below the value nend thereof at the end of the series of images in a step S37, processing is continued at step S33. Otherwise it is decided in [[a]] step S39 whether button 97 was again operated for indicating an end of the procedure (S39). If the end of the procedure is not indicated, processing is continued at step S31 for displaying the series of images again.

While the above illustrated embodiment uses one single light source for generating the light beam illuminating the object with visible light and for exciting the fluorescence, a further embodiment may use different light sources for generating the visible light and the excitation light, respectively. The light source generating the excitation light may then be switched on and off according to the application.

A further embodiment may include two or plural light beams generated by one single light source or separate light sources wherein each beam includes the visible light and the excitation light.

In the embodiment illustrated above with reference to figures 1 to 3 the microscopy system 1 uses filters 84 and 85 which are transmissive filters. An alternative embodiment may use corresponding reflective filters which may be provided by a suitable coating of reflector 72 of the light source or which may be provided by separate reflectors with desired filter characteristics which separated reflectors may be inserted in the beam path with an actuator under control of controller 35.

In the embodiment illustrated above with reference to figures 1 to 3 the microscopy system 1 with its filters 57, 84 and 85 and filter characteristics shown in figures 2a, 2b, 2c, respectively, is optimized for observing the fluorescence of indocyanine green. In alternative embodiments the above illustrated principles may be applied to an observation of alternative fluorescent substances by adapting edges 90 and 61 of characteristics 89 and 58 to the corresponding excitation wavelengths and fluorescent wavelengths of the alternative fluorescent substance.

Figure 4 schematically illustrates a beam path of a further embodiment of a microscopy system 401 ~~1~~. The microscopy system comprises an objective lens 403 ~~3~~ having plural lenses 405 ~~5~~ and 406 ~~6~~. Lenses 405 ~~5~~ and 406 ~~6~~ are covered with antireflective coatings such that reflections of visible light at the surfaces of the lenses are reduced. The antireflective coating may be designed such that also reflections of infrared light and near infrared light at the lens surfaces are reduced.

Objective lens 403 ~~3~~ receives a divergent beam 409 ~~9~~ emanating from an object plane 411 ~~11~~ of the objective lens 403 ~~3~~. The diverging beam 409 ~~9~~ is transformed by the objective lens to provide a substantially parallel beam downstream of the objective lens. Downstream of the

objective lens 403 ~~3~~ and above the objective lens in the representation of figure 4 there are provided two zoom systems 413 ~~13~~ and 414 ~~14~~ which are schematically indicated in figure 4. Each zoom system ~~13, 14~~ 413, 414 uses a partial beam ~~15, 16,~~ 415, 416, respectively and supplies the same to oculars ~~17, 18,~~ 417, 418, respectively of the microscopy system. A user may perceive a magnified sharp image of object plane ~~11~~ 411 by looking into the oculars ~~17 and 18~~ 417 and 418 with his right and left eyes, respectively. Visible light is used for generating these images of the object plane ~~11~~ 411. For this purpose, the object plane ~~11~~ 411 is illuminated with visible light supplied by an illumination system ~~21~~ 421 comprising a xenon lamp ~~23~~ 423 and beam shaping lenses ~~24 and 26~~ 425 and 426.

The microscopy system ~~1~~ 401 further comprises a camera ~~35~~ 433 for detecting a substantially sharp image of the object plane with visible light. The camera ~~33~~ 433 comprises a CCD camera chip ~~35~~ 435 having a light sensitive substrate positioned in an image plane ~~37~~ 437. A beam splitter ~~29~~ 429 is provided in the partial beam ~~16~~ 416 for branching off a beam ~~31~~ 431 therefrom and for supplying beam ~~31~~ 431 to a camera adapter optics ~~39~~ 439 supplying the beam ~~31~~ 431 to the camera such that the substantially sharp image of the object plane ~~11~~ 411 is generated at the image plane ~~37~~ 437. The images detected by camera ~~33~~ 433 may be used for documentation or they may be displayed by an display apparatus for displaying the image of the object plane ~~11~~ 411 for users who may not directly use the oculars ~~17, 18~~ 417, 418. The images of camera ~~33~~ 433 may be in particular supplied to a head mounted display of a user.

The microscopy system ~~1~~ 401 comprises a camera ~~41~~ 441 for detecting images of the object plane with infrared light. Camera ~~41~~ 441 comprises a CCD camera chip ~~43~~ 443 having a

light sensitive substrate positioned in an image plane ~~45~~ 445. A camera adapter optics ~~47~~ 447 is provided for supplying a beam ~~51~~ 451 branched off from the partial beam ~~51~~ 451 by a beam splitter ~~49~~ 449 to the CCD camera chip ~~43~~ 443. The camera adapter optics ~~47~~ 447 is configured such that a substantially sharp image of the object plane ~~11~~ 411 is generated in image plane ~~45~~ 445 with infrared light. Thus, the cameras ~~33 and 41~~ 433 and 441 differ from each other in that camera ~~33~~ 433 generates a substantially sharp image of the object plane ~~11~~ 411 with visible light, and camera ~~41~~ 441 generates a substantially sharp image of the object plane with infrared light. According to one conventional definition the infrared light may comprise wavelengths in a range of 820 nm to 870 nm.

A filter ~~453~~ 453 is disposed in beam ~~51~~ 451 in front of camera ~~41~~ 441. Filter ~~53~~ 453 is adapted to the fluorescent substance which is used in the application. In the present example the filter ~~53~~ 453 is adapted to the fluorescence of indocyanine green such that it transmits substantially only light of a wavelength range between 820 nm and 870 nm. The fluorescent wavelengths of indocyanine green are within this wavelength range.

According to an alternative embodiment the beam splitter ~~49~~ 449 may be covered with a suitable coating such that the beam splitter ~~49~~ 449 deflects only infrared light.

Images detected by camera ~~41~~ 441 are supplied to a controller or computer ~~55~~ 455.

In an application according to one embodiment a tissue to be inspected, such as a human liver is positioned in the object plane ~~11~~ 411. Blood vessels extending through the tissue are substantially not visible if the tissue is observed by just using the visible light images provided by

oculars ~~17 and 18~~ 17 and 18. It is not easy to discriminate between blood vessel and surrounding lever tissue from such images. After an intravenous injection of ICG the fluorescent substance will accumulate in the vessels at a higher concentration than in surrounding tissue. An image of the tissue using light in the wavelength range of 820 nm to 870 nm will show higher intensities at locations corresponding to fluorescent vessels as compared to surrounding tissue.

An example of an image detected by camera ~~41~~ 441 and supplied to controller ~~55~~ 455 is schematically illustrated in figure 5a. A major portion 57 of an imaging field 58 shows a very low intensity. A portion 59 shows a slightly higher intensity, and two portions 61, 62 show even higher intensities. Within portion 61 there is located a portion 63 showing an even higher intensity of infrared radiation. It is assumed that the portions 62 and 63 are associated with blood vessels, whereas the portion 57 is associated with surrounding tissue. It is further assumed that the portion 59 is associated with surrounding tissue in which some low concentration of fluorescent substance has accumulated.

The microscopy system 1 further comprises a display system ~~465~~ 465 comprising an LCD chip ~~69~~ 469 positioned in a plane ~~67~~ 467. An image displayed with LCD chip ~~69~~ 469 is superimposed with partial beam ~~15~~ 415 by a projection optics ~~71~~ 471 and a beam splitter ~~73~~ 473. When looking into the ocular ~~17~~ 417 the user may perceive a superposition of the visible light image of the object plane and an image representation generated by display ~~69~~ 469. The controller ~~55~~ 455 may supply an image to display ~~69~~ 469 as it is schematically illustrated in figure 5a. The image displayed and perceived the user with visible light of e.g. blue color. Thus, the user is provided with a visible

representation of the infrared image in a superposition with the visible light image. The user may then recognize blood vessels positioned within the object field of the microscopy system 1.

However, the superposition of the visible light image with the image according to figure 5a would result in a reduction of the information which may be gained from the visible light image within portions 61 and 62 since these portions are indicated in blue color. To improve this situation the controller ~~55~~ 455 performs an analysis of the images received from camera ~~41~~ 441. The controller determines those coherent portions of the image showing intensities above a predetermined threshold. Using a suitable predetermined threshold a discrimination may be made between blood vessels and surrounding tissue. In the example shown in figure 5a the threshold will be adjusted such that the intensity in the portion 59 is below the threshold, and such that the intensities within portions 62 and 63 are above the threshold.

After identifying the coherent portions exceeding the threshold the controller ~~55~~ 455 will determine peripheral lines surrounding the coherent regions. Such peripheral lines are associated with a boundary between the coherent portions and the surrounding portions of the image. The controller ~~55~~ 455 supplies data representing the peripheral lines to the display ~~65~~ 465. The display generates an image of the peripheral lines, and such image is superimposed with the visible light image as schematically illustrated in figure 5b. In the image, only the peripheral lines 75 of portions 61 and 62 are shown in blue color. Thus, the user is provided with the information relating to the blood vessels which are located in an interior of the peripheral lines 75, and the user may still perceive the visible light image of the blood vessels as usual, and he may perform a

surgical treatment of these blood vessels while observing the visible light image thereof.

A filter ~~77~~ 477 is disposed in a beam path of illumination system ~~21~~ 421. Filter ~~77~~ 477 is substantially not transmissive for wavelengths of the fluorescent emission of the fluorescent substance. The object will not be illuminated with fluorescent light such that the fluorescence of the substance is visible in the images detected by camera ~~41~~ 441 with a relatively high contrast and low background.

Additionally, a filter chopper ~~79~~ 479 is disposed in the beam path of the illumination system ~~21~~ 421. The filter chopper ~~79~~ 479 is rotatably driven by a motor ~~89~~ 481 which is controlled by controller ~~55~~ 455. The filter chopper comprises plural sectors which are subsequently transmissive and non-transmissive for light at wavelengths in a range between 750 nm and 820 nm. All sectors of the filter chopper ~~79~~ 479 are substantially transmissive for visible light. The excitation of the fluorescent substrate is modulated by rotating the filter chopper ~~79~~ 479. The intensities of the fluorescent images detected by camera ~~41~~ 441 are modulated in time, accordingly, and the controller ~~55~~ 455 may analyze the time dependency of the fluorescent image by a method such as a lock-in method for further reducing noise and background in the fluorescent image.

An alternative embodiment of the illumination system illustrated above is indicated by dashed lines in figure 4. The alternative illumination system ~~90~~ 490 comprises a light source ~~91~~ 491 separate from light source ~~23~~ 423. Light source ~~91~~ 491 is provided for illuminating the object with visible light, whereas light source ~~23~~ 423 is only provided for generating the excitation light of the fluorescent substance. Thus, the illumination with visible

light is independent from the illumination with excitation light, and a rotation of the chopper wheel ~~79~~ 479 may not modulate the illumination with visible light which modulation might disturb the user in observing the visible light image of the object. According to a further embodiment the light source ~~23~~ 423 is a laser light source which is rapidly switched on and off by the controller ~~55~~ 455 for modulating the excitation light. The light modulating chopper may be omitted in such embodiment.

The microscopy system further comprises an optical coherence tomography (OCT) apparatus 200 emitting an analyzing light beam 205 and directing the analyzing light beam 205 onto a beam scanner 260. Beam scanner 260 comprises a mirror for directing the analyzing light beam onto the object plane ~~11~~ 411 and to focus the analyzing light beam 205 onto the object plane. The beam scanner 260 is controlled by controller ~~550~~ 455 for selecting the locations at which the analyzing light beam 205 is directed onto the object plane and to change those locations. The OCT apparatus 200 detects depth profile data of the object at the selected location and transmits the depth profile data to controller ~~55~~ 455. OCT apparatuses are well-known from the art. Examples are given in US 5,493,109 and US 5,795,295, the full disclosure of which is incorporated herein by reference.

A function of the OCT apparatus 200 is shortly illustrated with reference to figure 6 below. The apparatus 200 comprises a white light source 220 emitting radiation coupled into an optical fiber 230. A beam coupler 240 is provided for coupling the radiation into two optical fibers 250 and 270. One partial beam of fiber 270 is directed onto a reference mirror 290 through a lens 280. The partial beam of fiber 250 is collimated through a lens 251 as the analyzing light beam 205 ~~250~~ and directed to the beam

scanner 260. The beam scanner 260 directs the analyzing light beam 205 ~~250~~ onto the object 255 to be inspected. Radiation of the analyzing light beam 205 received back from the object is supplied by beam scanner 260 in a reverse direction back to the OCT apparatus 250 ~~200~~ and coupled into fiber 250. The radiation reflected back from mirror 290 is again coupled into fiber 270. The beam coupler 240 superimposes the radiation received from the object through fiber 250 and the radiation reflected back from mirror 290 through fiber 270 and couples the superimposed radiations into fiber 265. Fiber 265 supplies the superimposed radiation to a photodetector 275. An output of the photodetector is demodulated by a demodulator 285 and transformed to computer readable data by an analog-digital-converter 295 and supplied to the controller ~~55~~ 455.

The detector 275 receiving the radiation from the object 255 and the mirror 290 detects a signal which is increased by interference if optical wavelengths of the two partial beams between the beam splitter 240 and their superposition at the beam splitter 240 are equal within a coherence length of the light source. For achieving such equal optical beam paths, the reference mirror 290 is displaceable in a direction indicated with arrow 291 in figure 6. By displacing the mirror 290 and recording the corresponding intensities detected by detector 275 it is possible to detect a depth profile of the object 255 at that location at which the analyzing light beam 205 is directed onto the object 255. Obtaining such depth profile is time consuming since the mirror 290 has to be mechanically displaced.

The controller ~~255~~ 455 controls the beam scanner 260 to direct the analyzing light beam 205 to those locations on the object at which depths profiles should be recorded. The

controller ~~55~~ 455 limits the recording of depths profiles to only those portions or analyzing regions which have been previously determined by controller ~~55~~ 455 from the fluorescent light image which are indicated by reference numeral 62 and 63 in figure 5b.

The controller ~~55~~ 455 controls the beam scanner 260 such that depth profiles are recorded at a plurality of locations positioned on straight lines 213 within portions 62, 63, wherein the straight lines 213 are vertically arranged in the visible field 58 and disposed at a predetermined distance from each other. The depth profiles recorded along lines 211 are displayed on a display 207 of the microscopy system ~~1~~ 401. A keyboard 209 or other input means, such as a mouse, may be used for selecting the configuration of the straight lines 213 within the visible field 58, such as an orientation thereof and distance from each other. Further, one of portions 62, 63 may be selected such that depths profiles for the selected portion are not shown on display 207.

It is also possible to display some selected of the depths profiles by imaging system 65 and to superimpose such representations with the visible light image perceived through the ocular such that the user may analyze the depth profile while observing the image of the object through the ocular.

In the above illustrated embodiments indocyanine green is used as the fluorescent substance. However, other fluorescent substances may be also used. In particular, an auto-fluorescence of substances of the human body may be observed. As an alternative or in addition to the analysis of intensities of fluorescent images, also fluorescent half times may be analyzed for discriminating fluorescent regions from each other within the object field.

According to further embodiments the image generated by display apparatus 65 is coupled into partial beam ~~16~~ 416 rather than partial beam ~~15~~ 415. Alternatively corresponding representations may be coupled into both partial beams.

In the preceding embodiments the peripheral lines 75 are represented as full lines. According to further embodiments, the peripheral lines may be represented as broken lines, dotted lines, dot-dashed lines or other types of lines, or the interior of the coherent portions may be represented as a shaded or hatched region of the image.

Therefore, while the present invention has been shown and described herein in what is believed to be the most practical and preferred embodiments, it is recognized that departures can be made therefrom within the scope of the invention, which is therefore not be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent methods and apparatus.